

Quantification and Characterization Campaign
of Household Waste from Cap Haitien (Haiti)
conducted in December 2016 for the

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Context and objectives

- Cap-Haitien: about 500 000 inhabitants, 2nd city of the country. No real waste collection, numerous deposit all over the city. Waste are pickup in the streets when too much.
- Willingness of the IDB to help improve waste management in the district of Cap Haitien. Important investments envisaged in the short term (composting plant and landfill).
- 1st fundamental point: to have a good idea of the characteristics of the waste to be treated to choose the most suitable investments.
- Objectives of this study: to determine the amount of household waste produced per inhabitant and their composition.

Quantification method

- 3 socio-economic levels (low, medium and mixed income), 6 geographic sectors, 2 by level
- About 200 household for each level (total of 600) to have representative data
- Collection door to door during 2 weeks, 2 times per week, 2 plastic bags given for each time : one for wet biodegradable waste, one for dry waste, with the reference of the household
- Bags collected by level and weighted one by one, 200 household each day, 400 bags, during 12 days (4800 bags).
- About 13 tons of waste collected and weighted bag by bag.

Quantification method

Material :

1 little truck rented for the bag collection

5 000 bags of 60 liters (2500 blue et 2500 white)

24 rolls of adhesive tape, 24 felt pens

2 weighing machines

1 table, 2 chairs

Human means: 12 animators, 12 pickers, 1 driver, 6 people to carry and weigh the bags

Quantification method

	Semaine 1						Semaine 2					
Collecte des sacs	lundi	mardi	mercredi	jeudi	vendredi	samedi	lundi	mardi	mercredi	jeudi	vendredi	samedi
secteur 1A	yellow			yellow			yellow			yellow		
secteur 1B	orange			orange			orange			orange		
secteur 2A		blue			blue			blue			blue	
secteur 2B		light blue			light blue			light blue			light blue	
secteur 3A			orange			orange			orange			orange
secteur 3B			brown			brown			brown			brown

Réunion de quartier à Petit-Anse. Remise des premiers sacs.



Réunion de cadrage avec les animateurs



Le groupe d'animateurs encadrés par Gaston Jean (en blanc)



Au petit matin, la collecte est en cours



Le terrain du PDR de Petit Anse et la toilette Soil Première activité du matin : signer la liste de présence



La zone de pesée



Les sacs pleins de déchets arrivent



Une chaîne humaine pour les décharger rapidement



La pesée peut commencer



Quantification study - Results

Réf quartier	Quartier	Nombre d'habitants concernés	Nombre moyen d'habitants par ménage (moyennes arithmétiques sans prendre en compte la proportion réelle d'habitants dans chaque quartier qui est			
1A1	Centre ville 1 à 15	233	4,66	4,69	4,74	5,10
1A2	Centre ville 16 à 24	236	4,72			
1B1	Champin 1	236	4,72	4,79		
1B2	Champin 2	243	4,86			
2A1	Shada 1	236	4,72	5,04		
2A2	Shada 2	268	5,36			
2B1	Cité du peuple 1	249	4,98	5,14		
2B2	Cité du peuple 2	265	5,30			
3A1	Petit-Anse 1	287	5,74	5,72	5,47	
3A2	Petit-Anse 2	285	5,70			
3B1	Babirole 1	261	5,22	5,22		
3B2	Babirole 2	261	5,22			
		3060				

Quantification study - Results

Réf quartier	Quartier	Quantité moyenne de déchets par habitant et par jour (kg/hab.jour) sans prendre en compte la proportion réelle d'habitants dans chaque quartier				Nombre de ménages conservés
1A1	Centre ville 1 à 15	0,40	0,45	0,52	0,41	29
1A2	Centre ville 16 à 24	0,50				
1B1	Champin 1	0,58	0,58			36
1B2	Champin 2	0,58				37
2A1	Shada 1	0,24	0,31	13		
2A2	Shada 2	0,38		18		
2B1	Cité du peuple 1	0,35	0,34	50		
2B2	Cité du peuple 2	0,32		25		
3A1	Petit-Anse 1	0,39	0,37	37		
3A2	Petit-Anse 2	0,35		47		
3B1	Babirole 1	0,37	0,40	33		
3B2	Babirole 2	0,42		33		
						393

Characterization method

Study of the composition of white bags and blue bags per geographic sector and socio-economic level.

Content of the bags emptied on the ground, homogenized and subsampled by quartering to have a sample mass of about 200 kg. If the total mass is less than or close to 200 kg, the bags are opened directly on the sorting tables.

Sorting into 15 categories: organic matter, diapers, textiles, paper, cardboard, soft plastic, plastic bottles, other plastics, other mainly organic waste, glass, ferrous metals, non-ferrous metals, other mainly inorganic wastes, hazardous waste, fine elements.

Weighing of the different categories.

Characterization method

Material:

2 sorting tables (for the blue and the white bags) locally made in wood

20 bamboo braided baskets of about 50 liters

10 buckets of 20 liters

2 weighing machines

1 wheelbarrow

Tools

Personal protective equipment: anti-puncture gloves, masks, pants

Human means: every day 6 experienced people, 6 people employed locally, 2 to 5 trainees



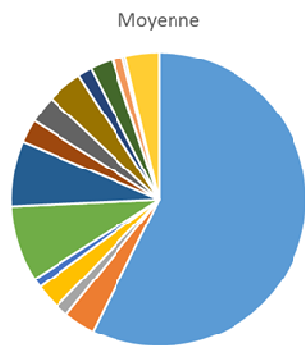
Masse des échantillons triés (en kg)										
	échantillon 1		échantillon 2		échantillon 3		échantillon 4		Total trié	
	bleu	blanc	bleu	blanc	bleu	blanc	bleu	blanc	bleu	blanc
1A	194	120	65	238	239	201	216	174	714	733
1B	218	108	263	171	225	223	222	297	928	799
2A	84	93	135	111	210	200	164	192	593	596
2B	214	93	248	153	345	140	293	108	1100	494
3A	291	185	342	180	339	198	216	206	1188	769
3B	266	98	333	140	192	289	200	219	991	746
								Total	5514	4137

48 samples sorted
(4 each day)

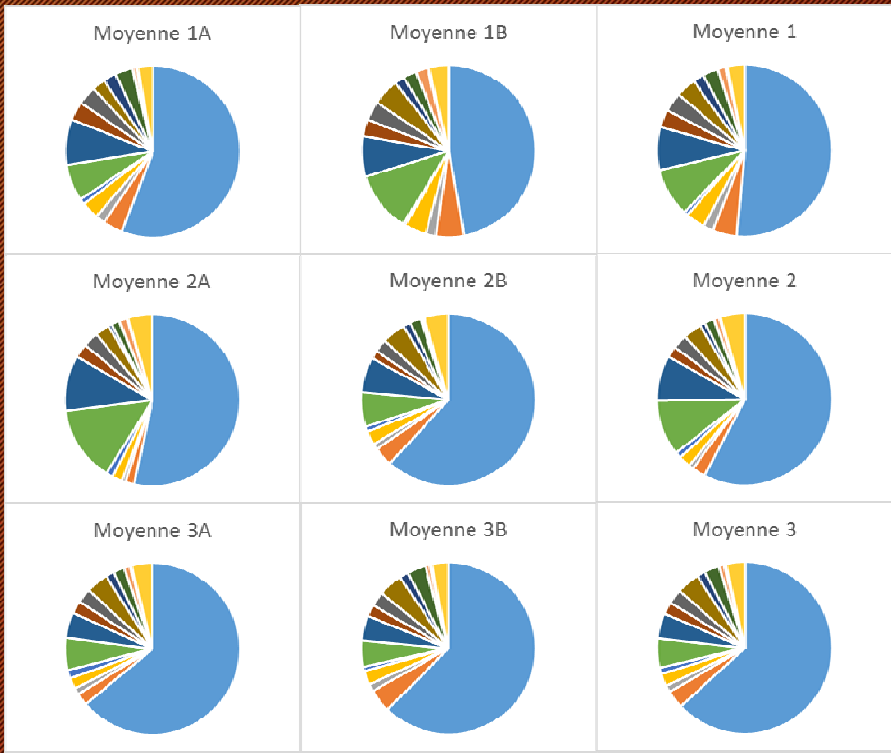
Characterization study - Results

Catégories	Composition moyenne			Moyenne
	Niveau 1	Niveau 2	Niveau 3	
Matière putrescible	51,5%	57,5%	63,1%	57,4%
Couches	4,4%	2,6%	3,4%	3,4%
Papier	1,9%	0,9%	1,3%	1,3%
Carton	3,7%	2,2%	2,4%	2,8%
Bois	0,8%	1,1%	1,2%	1,0%
Textile	9,1%	10,4%	5,5%	8,3%
Plastique souple	8,1%	8,6%	4,7%	7,1%
Bouteilles et flacons plastique	3,3%	2,1%	2,3%	2,6%
Autres plastiques	3,6%	2,7%	2,8%	3,0%
Autres déchets organiques	3,7%	3,6%	4,3%	3,9%
Verre	2,1%	1,0%	1,6%	1,6%
Métaux ferreux	2,8%	1,7%	2,7%	2,4%
Métaux non ferreux	0,1%	0,1%	0,1%	0,1%
Autres déchets minéraux	1,4%	0,9%	0,9%	1,1%
Déchets dangereux	0,3%	0,3%	0,3%	0,3%
Eléments fins < 20mm	3,2%	4,5%	3,5%	3,7%

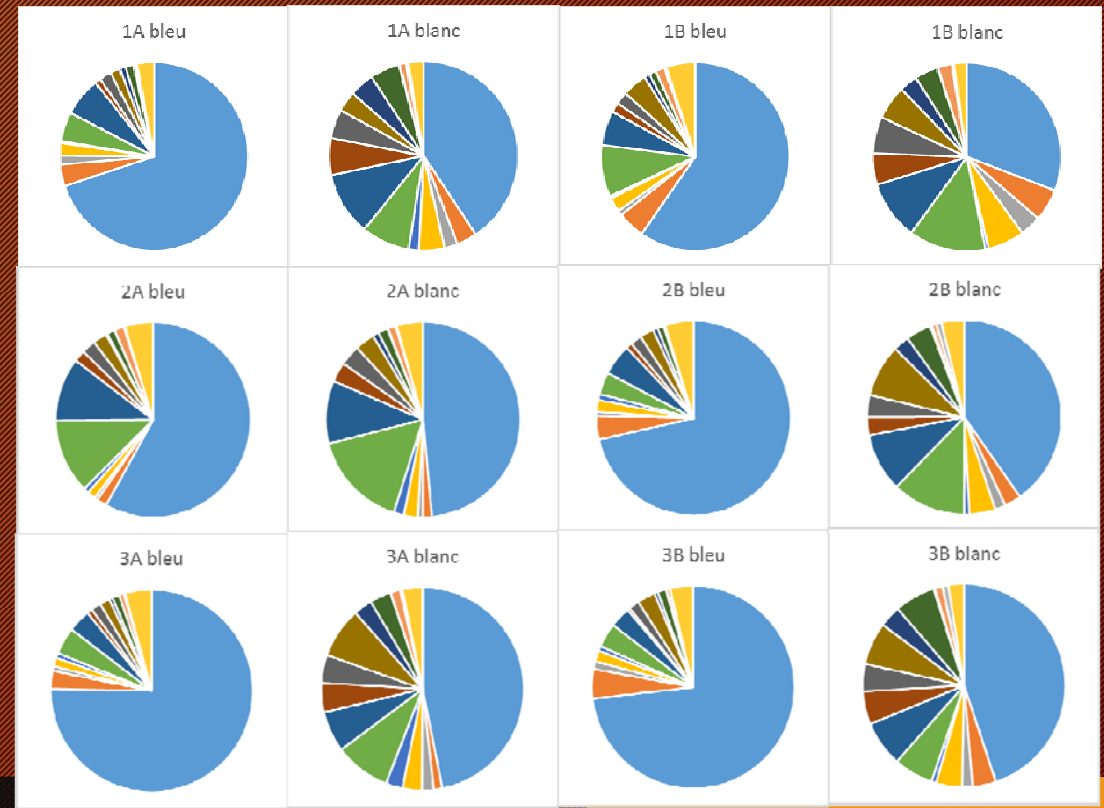
Characterization study - Results



- Matière putrescible
- Papier
- Bois
- Plastique souple
- Autres plastiques
- Verre
- Métaux non ferreux
- Déchets dangereux
- Couches
- Carton
- Textile
- Bouteilles et flacons plastique
- Autres déchets organiques
- Métaux ferreux
- Autres déchets minéraux
- Éléments fins < 20mm



Characterization study - Results



Characterization study - Results

Household survey

Conducted just after on a sample of households in each sector (234 households).

- 94% ready to sort systematically. Of these, 81% would like specific containers, bags or bins.
- 99.6% want a regular pick-up at home but 82% would also be willing to carry their waste to gathering points located at a short distance (less than 50m for 91%, 50 to 100m for 7%).
- In the case of collection at home, 80% would like 2 passages per week, 14% 3 passages.
- 66% would be willing to pay 10 HTG per passage (0.14€), 30% 25 HTG (0.36€), 6% 50 HTG, 3% more than 50 HTG.
- Crossing these last two answers would mean that nearly 80% of people would be willing to pay between 100 and 200 HTG per month (1.5 to 3€).

Conclusions

Quite a small amount of waste produced per inhabitant (closer to 0.4 kg / inhabitant.day than to 0.6 as assumed in previous studies): a difference of 1/3 not insignificant in terms of treatment plant sizing.

Quite few differences in terms of composition according to different neighborhoods and socio-economic levels, without real importance for the strategy.

Urgent request for the organization of the collection of waste, acceptance to sort at source and to pay for the service.

Conclusions

Important percentage of potentially recoverable waste, more than 70%:

- Production of compost from biodegradable materials (putrescible, diapers, paper, cardboard, fine elements)
- Matter recovery from paper, cardboard, plastics, glass, metals, rubber, electrical and electronic waste
- Production of a fuel based on natural matters (woody plant waste, paper, cardboard, wood, natural fiber textiles, natural organic waste such as hair, ropes, etc.)
- Eventually production of a fuel from synthetic organic material (non recyclable plastics,...), in the eventuality of an energy production facility meeting strict environmental standards.

It would remain to manage hazardous waste, by storing it appropriately.
Landfill could be limited to a relatively small volume of low polluted refuses.

Conclusions

Between the two extremes (everything in landfill or maximum recovery), it is the political will and the means available in terms of investment and operation that will determine the choices.

More and more cities are adopting Zero Waste targets, which could be developed in developing countries with adapted technologies.

Thank you !

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